

# PATENT SPECIFICATION

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## (54) FITTED CONTOUR SHEET

(71) I, SIDNEY MATTHEW WEISS, a citizen of the United States of America, residing at Round Hill Road at Edson Lane, Greenwich, State of Connecticut, United States of America, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to fitted contour sheets for application to bed mattresses, studio couches and so forth.

As is well known, a wide variety of contour type bed sheets have been developed in recent years for application to the mattresses of beds, which sheets conform substantially to the lines of the mattress to which they are applied. In order for these sheets to conform adequately to the surfaces of the mattress, in order to eliminate wrinkles and so forth after they are put on the mattress, the size of the sheet must be such and the construction thereof must be such that a certain degree of tension is applied to the edges and corners of the contour sheet.

Furthermore, in order to get the sheet on the mattress in the first place, it is necessary to raise the mattress corners, at least on one side thereof in order to slip the mattress, so to speak, into the pocket formed by the contour of the sheet. Certain developments have been devised in order to slip the sheet onto the mattress more easily, including separate elastic inserts at the corners of the sheet, which will give to a certain extent so that the sheet may be more easily slipped onto the mattress. Other arrangements include the incorporation of elastic or other stretch type tapes along the dividing lines between the sides and the top of the sheet, or along the edge of the sheet so that it will more readily conform to the contours of the mattress to which it is applied. Desirably,

the stretch characteristics of these various inserts will act after the sheet is put on the mattress to help retain the sheet in a non-wrinkled condition over the mattress surface.

Other advances included in the development of contour sheets in recent years include no-iron type fabrics utilized in fitted contour sheets. These fabrics are usually comprised of part cotton and part synthetic fibers, which are impregnated with "permanent press" type resins, so that upon washing and drying, the sheets will have relatively little wrinkles, and when applied to mattresses and conformed to the surfaces thereof will be substantially non-wrinkling in appearance.

However, certain disadvantages may arise from these various prior art constructions. For example, when contour sheets are made from the so-called permanent press type fabrics, they have very little shrinkage characteristics. Generally, if stretch characteristics are applied, they are only in a single direction stretch, or width-wise stretch. Accordingly, on subsequent use over a period of time, and because of the stretch characteristics only in one direction of the sheet, the degree of tension applied to the corner construction in putting on and taking off the sheets sequentially over a period of use causes the stitchings in the corners of the sheets to fail. In addition, elastic inserts applied to the sheets have a tendency to fail after a plurality of washings because the hot water and detergents utilized for washing such sheets have a tendency to break down the elastic characteristics.

These disadvantages are particularly apparent in hospital use where the mattresses are continuously being deformed when the hospital beds are cranked in order to raise and lower the head and/or foot portion of the mattress repeatedly for various reasons relating to the treatment of

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a patient. It has been found that conventional contour, woven sheets have a use span of approximately one-half that of flat sheets because of corner tear. Accordingly, most hospitals have found it desirable to use regular flat sheets because they last longer and because they're more easily applied to the comparatively rigid mattresses utilized on hospital beds. In this connection, it should be noted further, that conventional woven sheets, because of their comparative non-stretch characteristics, do not conform appropriately to hospital mattresses when they are in their "cranked-up" position, thus making the patient more uncomfortable because of the wrinkles formed.

In accordance with this invention we provide a contour fitted sheet for application to a mattress comprised of one piece of two-way stretch knitted 100% cotton fabric devoid of separate pieces or elastic inserts and mitered at each of the four corners thereof to form a top surface panel and four side panels, each pair of edges of each mitered corner being joined by a single seam, said fabric forming said sheet being pre-shrunk in its longest dimension.

With such an arrangement, and because of the two-way stretch characteristics of both the side panels as well as the top surface panel of the formed sheet, the sheet will conform to a variety of different size mattresses. For example, a sheet constructed to fit conventional twin size mattresses will also fit a studio size mattress from a studio couch as well as single bed mattresses. A second size will fit conventional double size mattresses, as well as three-quarter size mattresses.

Furthermore, because of the two-way stretch characteristics of each panel of the sheet, no excessive tension is applied to the corners of the sheet because not only will the adjacent side panels give in both directions, but also the top panel in the area adjacent the corner will also give in two different directions. Accordingly, failure in the corner stitching is substantially eliminated and need for separate elastic insert pieces and/or tapes at the corner areas along the line between the top surface panel and the side panels, or at the bottom edge is eliminated.

The ability of such contour sheets to conform to a variety of different size mattresses, and the fact that those sheets are made from a single piece of material requiring no further additional pieces or inserts, makes the invention herein highly advantageous from a commercial standpoint.

The two-way stretch material which may be utilized herein is a knit fabric such as jersey, for example, and preferably first

knitted in tubular form which is subsequently slit and opened. Furthermore, the length of the knit fabric is compressed mechanically approximately 20%. This serves to render the fabric virtually shrinkage-free in the length direction, thus guaranteeing less than 1% shrinkage, even after repeated washings. In addition, the length direction is provided with stretch characteristics when stress is applied in the lengthwise direction, in contrast to conventional single knits which have little or no flexibility in the length direction. Furthermore, it should be noted that the fabric, returns to its original compressed size after laundering, thus not only controlling shrinkage as noted above, but also maintaining its original flexibility and stretch capabilities.

One method for obtaining such stabilized and balanced two-way stretch fabric includes knitting the fabric into tubular knitted form, and then spreading the tubular knitted fabric in the widthwise direction to a predetermined tension and steaming it to set and maintain the width. Subsequently, the fabric is compressively shrunk lengthwise in a sequence of steps including acting primarily upon one surface of the fabric, controllably lengthening the fabric and then acting on the opposite surface, with a final application of tension widthwise. Subsequent to this series of treatments, the stabilized and balanced tubular two-way stretch fabric is slit and opened.

The contour fitted bed sheet, to be described in detail later on may advantageously be constructed of plain cotton fabric, while simultaneously providing the "no-iron" characteristics noted above, with the latter being provided because of the compressed nature of the two-way fabric utilized. That is, there is no need to utilize more expensive cotton-synthetic fabric combinations because the sheet of the invention fits the mattress snugly with no wrinkles. Furthermore, the cotton knitted fabric discussed herein has been found to be a substantially more "comfortable" material for this purpose than synthetic fabrics or fabrics treated with significant amounts of permanent press resins. Also, the sheets herein provide better soil release, freedom from yellowing and high moisture absorbency, simultaneously with the "no-iron" characteristics.

In the accompanying drawings:—

FIGURE 1 is a perspective view of a bed mattress having installed thereon a fitted contour bed sheet in accordance with this invention;

FIGURE 2 is an enlarged fragmentary plan view, illustrating construction details of the bed sheet shown in Figure 1; and

FIGURE 3 is an enlarged fragmentary

cross-sectional view taken generally along line 3-3 of Figure 1.

Referring to the drawings, in which like reference characters refer to like parts throughout the several views thereof, Figure 1 illustrates a conventional bed mattress 10 having a contour sheet 11 in accordance with this invention fitted thereon. The contour sheet has a top surface panel 12 and side panels 14 and 16, with side panels 15 and 17 not showing in the view of Figure 1.

As can be seen in Figure 1, the side panels 14 and 16 are joined by a single seam 18, with no separate inserts or elastic tapes included at the corner joining these two side panels together:

As shown in Figure 2, each corner of the sheet 11 is mitred to form the side panels 14, 15, 16 and 17, the panels being provided with arcuately cut end edges 20, 22 as shown on panels 14 and 16 respectively in Figure 2 which, when joined together by a corner seam 18, serves to draw the lower edge extremities 24 of the side panels inward under the bottom of the mattress. This is particularly true at the corners of the mattress and will be true to a lesser extent between the corners, as reflected at 26 in Figure 3. This configuration causes the sheet to be "self-holding" on the mattress, and because of the two-way stretch characteristics of the fabric utilised for the sheet, it readily conforms to the contour of the mattress to which it is applied without any wrinkles. Preferably, the lower edges 24 of the side panels will be rolled into several layers and stitched to prevent unravelling of the cut edges, all in well known manner.

The material of the sheet is 100% cotton, having the stretch characteristics noted above. That is, fabric utilized will be a stabilized and balanced two-way stretch material compressed lengthwise mechanically as previously explained by approximately 20%, thus giving it appropriate stretch characteristics in both directions in all five panels of the contour sheet in its fitted position on a mattress. Because of this, there is appropriate "give" in all directions of the contour sheet, particularly at the corner seam areas, thus reducing substantially failure of the corner construction. In addition, because of the one-piece construction, in accordance herewith, requiring only four seams at the four corners of the one-piece of material forming the sheet to join the mitred edges together, construction costs are substantially reduced.

Furthermore, because of the simultaneous built-in control of shrinkage, together with the maintenance of the original flexibility and stretch capabilities of the constructed sheets, they are not only long lasting in use, even after repeated launderings, but they are substantially easier to use for institutional application. Also, because of the 100% cotton construction, the material is substantially more comfortable, particularly for institutional use or for infant care, and reduces substantially the incidence of sheet burn experienced from extended bed confinement.

Because of the increased stretch characteristics of the sheets produced in accordance herewith, a substantial reduction in the number of sizes can be made thus reducing inventory requirements. Also, because of the simple construction, the sheets are quickly, cheaply, and easily produced in large quantities for use in such places as hospitals, rest homes, and the like, as well as for private consumption, thus making the contour fitted sheets herein highly advantageous commercially.

#### WHAT I CLAIM IS:

1. A contour fitted sheet for application to a mattress comprised of one piece of two-way stretch knitted 100% cotton fabric devoid of separate pieces or elastic inserts and mitred at each of the four corners thereof to form a top surface panel and four side panels, each pair of edges of each mitered corner being joined by a single seam, said fabric forming said sheet being pre-shrunk in its longest dimension.

2. A sheet as claimed in claim 1 in which said fabric is mechanically compressively pre-shrunk in its longest dimension.

3. A sheet as claimed in claim 2 in which said fabric is mechanically compressively pre-shrunk by about 20%.

4. A sheet as claimed in claim 1, 2 or 3, in which said pairs of edges forming the mitred corners are arcuate.

5. A sheet as claimed in claim 1 in which the bottom edges of said side panels are rolled and stitched to form a binding devoid of elastic inserts.

6. A contour fitted sheet substantially as herein described with reference to the accompanying drawings.

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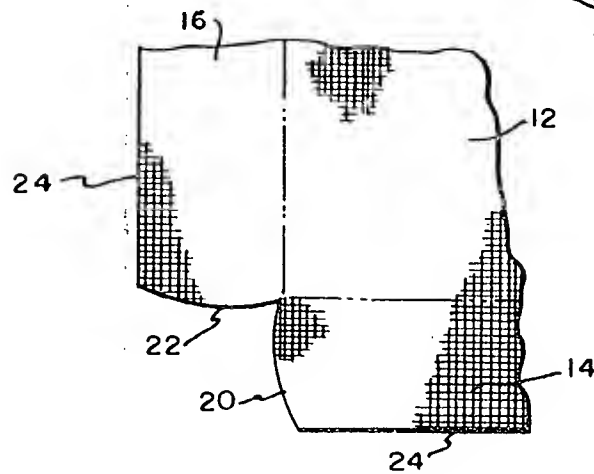
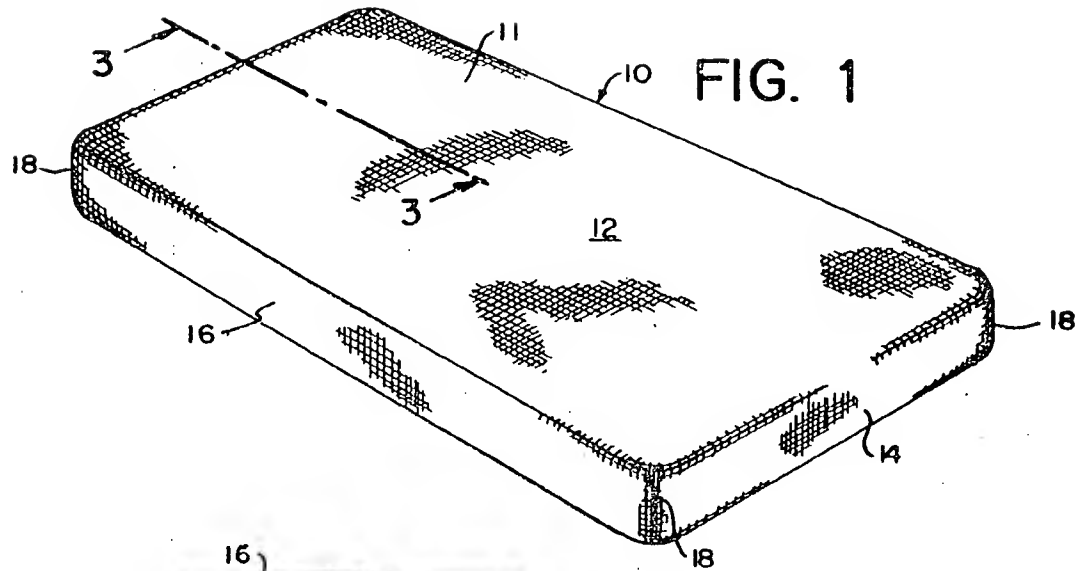


FIG. 3

